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EDITORIAL

The Food Policy The recently concluded United Nations Conference on Food and Agriculture held at Hot Springs, Virginia U. S. A., made a declaration to the effect that a child or adult should get the nourishment necessary for full health and that the primary responsibility lies with each nation for seeing that its own people have the food needed for health and life. This leaves no room for any country to take a light view of the food situation that is confronting the Allied Nations at present. In his address to the delegates to the above conference, President Roosevelt, while accepting the above declaration on behalf of the United States, drew pointed attention to the importance of the problem both during war and peace time and called for a sound agricultural programme for the future. The matter becomes all the more important when it is realised that no nation ever had enough food to feed all its people as we now know how human beings should be fed. According to statistics, India grows but 25 million tons of rice as against 27 million tons she consumes and 10 million tons of wheat as against 9½ million tons required by her. In the matter of *cumbu, cholam* and *ragi* which are the other food grains largely consumed, India is said to be self sufficient, while she is not producing enough of her requirements in pulses. To meet this deficit and to supply the needs of some of the adjoining territories that have become a liability on her due to this global war, a Grow More Food campaign was inaugurated in India. The movement has since gained momentum and it is claimed that larger areas have been brought under arable farming and that production has been substantially increased. The various Provincial and State Governments have to their credit enactments of auxillary and ameliorative measures, such as rent-free assignment of lands, granting of concessions to cultivators, providing extra irrigation facilities, distribution of manures and seeds etc. Yet, with all these efforts we are told that there is shortage of food stuffs in many localities and that especially the poor class of people are left without adequate food supplies. Various causes are attributed to this situation of which hoarding, reluctance to release stocks by producers and merchants and the existence of black markets are said to be the most important. While we agree with this view and appreciate the sincere efforts of the Government to ease the situation, we urge that the production issue is faced more squarely. An unbiassed and critical review of the achievement of the Grow More Food campaign during the last two years would, we believe, bring out

clearly what further action should be taken to step up production of each of the essential commodities. It is for consideration whether the extension of cultivation, especially to the derelict land has diffused labour, work cattle, implements and fertilizers from lands under normal cultivation and thereby reduced the outturn from such lands. In the enthusiasm for extending the area under food crops we should not loose sight of this aspect. Every effort should be made to keep up or raise the level of yields from lands already under staple food crops by assuring adequate facilities for irrigation, manuring and labour supply. If necessary, special staff should be employed in particular tracts to do intensive propaganda on improved methods of cultivation. Experiments on District Farms have shown that growing a green manure crop or applying oil cake, using seeds of improved strains, thin-sowing of nurseries and close planting enhance the yield of paddy by 20 to 30 percent. If all the paddy tracts of this Province adopted these improved methods, probably the deficit in the supply of rice may be made good to a large extent. Now that we have passed through the preliminary and pioneering stages in the Grow More Food campaign, it is very desirable that a long-range view of the whole problem is taken by the Government and a definite policy laid down as the scope for planned agriculture is immense in this country. In previous issues of this Journal, we have suggested the encouragement of local production of artificial and organic manures, insecticides and fungicides, and for the provision of warehouses for storing produce free from the depradation of vermins—factors which have a direct bearing on increased production. We also suggest that greater attention may be paid to the encouragement of animal husbandry and dairying, including goat and poultry breeding, and development of inland fisheries and intensive sea fishing. Such a step would provide the nation with a variety of food stuffs and a nourishing diet which will keep up the vitality of its people and make them work effectively and efficiently in the defence of the country. We hope that the matter will receive the attention of the authorities concerned and that we will soon have long-range policies formulated in the matter of food production so that all people, rich and poor alike, are assured of the supply of adequate quantities of proper food at reasonable prices.

Birthday Honours Among the recipients of the Birthday Honours we are glad to find the names of Mr. P. M. Kareghat, I. C. S., who has been knighted and Mr. A. R. C. Westlake, I. C. S., who has been made Companion of the Indian Empire. Mr. Kareghat has long been connected with agricultural development in this country as the Vice-Chairman of the Imperial Council of Agricultural Research. Mr. Westlake, who is the Secretary to the Government of Madras in the Development Department was for sometime Director of Agriculture in this Province and was responsible for reorganising and strengthening the propaganda wing of the Department. He took a special interest in the activities of the Madras Agricultural Students' Union and this Journal. We offer our hearty felicitations to these distinguished civilians.

Studies on Soybeans in Sind

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Introduction The Soybean, *Glycine max* L. is a native of Eastern Asia. The culture and use of the Soybean are recorded in the ancient Chinese literature and undoubtedly date from a period long before the time of written documents. It is the most important legume in China where it is one of the most essential articles of food.

There is sufficient evidence to show that soybean has also been cultivated in Northern India and Burma since a long time. Major T. E. T. Aitchison (1881) found the soybean largely cultivated in the Kuram valley, North-west Frontier Province, especially in the Kuram district, occasionally in Hariab and also frequently as a weed in the cultivated fields. Hooper (1911) in his investigations on soybeans has recorded seeds aggregating perhaps into nine distinct varieties, collected from Burma and from places situated on the lower slopes of the Himalayas extending from Kashmir to Darjeeling. Woodhouse and Taylar (1913) describe nine Indian varieties secured from Darjeeling, Bankipur and Bhagalpur. Most of the Indian varieties have slender twining stems, small pods and small seeds. They resemble the wild soybeans much more closely than do the varieties of China and Japan. The existence of different local names for soybeans in Bengal, Assam, Nepal and the North-west Frontier Provinces is also an evidence of its ancient culture in India.

With the opening of the Lloyd Barrage in Sind, investigations into the possibilities of cultivation of soybean in Sind under the perennial irrigation system, were started at the Agricultural Research Station, Sakrand, in the year 1929; but all attempts failed until 1931 when for the first time a successful crop was grown for seed. Several varieties of soybeans obtained from abroad and from various provinces of India have been tested. The small seeded and late-maturing varieties have succeeded fairly well under the Sind conditions. It has been found difficult to establish foreign big-seeded varieties as their germination when sown in beds is very low and besides they are subject to white ant attack which does the most damage.

Cultivation method Soybean has been found to succeed on a variety of soils varying from sandy loam to loamy soils. The crop is rather sensitive to *Kalar* (alkali soils) and cannot be grown in stiff soils. In the United States of America, artificial inoculation of the land that has not previously grown soybean has been found necessary, while under the Sind conditions

the inoculation of land has not been found to result in any extra advantage. The last fortnight of June has been found to be the suitable time of sowing as nothing is gained by sowing the crop earlier. The crop whether sown early or late matures at the same time, *i. e.* in December. A spacing of 3 to 4 ft. between rows and 6 to 9 in. between plants has been found to give high yields. When the crop is grown for fodder purpose, the distance between the rows should be $1\frac{1}{2}$ to 2 ft. Under the Sind conditions, an average yield of 825 lb. of seed per acre has been obtained. The soybean crop was grown for fodder and it yielded on an average 10,300 lb. of green fodder in a single cutting, and did not give further cuttings. The yield of fodder when compared to that of *Jowar (Andropogon sorghum)* which yields about 20,500 lb. in one cutting, is very poor.

Description of varieties tested Twenty one varieties of soybeans obtained from different provinces of India and the foreign countries, viz U. S. A. United Kingdom and South Africa have been tried at Sakrand. These varieties for the sake of convenience have been classed into two groups, Indian (obtained from different provinces of India) and exotic, as they form two distinct groups. The Indian varieties have small seeds with oil content varying from 13 to 16 percent while the exotic varieties have big seeds with oil content varying from 16 to 21 percent. The word Indian does not necessarily imply that the origin of the varieties which fall in this group is in India. The history of these varieties is not known and some of these viz. Behrum and Mir-John-Hat which resemble foreign varieties in their habit of growth may have been originally imported from abroad.

(i) **Indian varieties** The following eight Indian varieties, the first six of which have a spreading habit of growth and the last two with bunch habit, have been tried at Sakrand.

Variety	Source from where obtained	Variety	Source from where obtained
Spreading types			
1. Pusa Yellow	Pusa	5. Burma Yellow	Rangoon
2. Pusa Chocolate	,,	6. Pengype	Madras
		Bunch types	
3. Pusa Black	,,	7. Behrum	do.
4. Punjab Yellow	Punjab	8. Mir-John-Hat	Ranchi

(a) *Spreading varieties* The basal portion of the stem is stout and upright and the other portion weak ; the branches specially the elongated terminals are more or less twining and are usually weak. The leaves are trifoliate and the leaflets are ovate lanceolate in shape and pale green in colour. The stem, leaves and pods are pubescent and the pubescene is found in two colours, whitish (termed as grey by Piper and Morse) and light fawn to tawny. All the varieties grown at Sakrand have purple flowers. The pods form in clusters of 2 to 3, and on account of long internodes, they appear scattered. These are small in size and have 2 to 3

seeds. Three seed colours, greenish yellow, chocolate and black were noted among the varieties tested. These varieties take 180 to 190 days, to ripen when sown in June.

(b) *Erect varieties* There are only two Indian varieties, viz. Mir-John-Hat and Behrum which come under this class. The stem of these is stout, upright and branching. The leaflets are ovate and big and they vary in number from 3 to 5 per leaf. The stem and leaves have dirty white (termed as greyish by Piper and Morse) pubescence. The flowers are purple and slightly bigger than those of the spreading varieties. The pods are formed in clusters of 3 to 5 and are slightly bigger, and the seeds slightly heavier than those of the spreading varieties described above. The ripening period of these beans is about 160 days when sown in June.

(ii) **Foreign varieties** Thirteen samples of soybeans, listed below, were obtained from abroad and tried at Sakrand.

1. Shangai	2. Larido	3. Chinese White
4. Dalny	5. Vilamskot	6. White Morse
7. Mommoth Yellow	8. A. K. White	9. Haberlandt
10. Barchet	11. Otootan	12. South African Brown
13. American Eye brow		

The habit of growth of all the varieties, except Barchet and Otootan, is erect and branching with a well defined main stem. In Barchet and Otootan varieties, the plants are slender and bushy and have a tendency to lodge. In erect as well as slender varieties, the leaves are trifoliate and the leaflets are usually ovate lanceolate in shape. All the varieties are pubescent. The erect types have the habit of fruiting in clusters while the slender types have the pods scattered. The pods are also pubescent and the pubescence occurs in two colours, light fawn and dirty white. All the varieties, except American Eye brow, have unicoloured seeds of straw yellow, black or brown. The American Eye brow variety has black seeds with brown saddle. The maturity period of these foreign varieties varies from 90 to 155 days. Almost all the imported varieties have well developed big seeds except Barchet and Otootan varieties which have comparatively smaller seeds.

Acclimatization The foreign varieties gave very poor germination in the first year. The stand and the growth of the crop were not satisfactory. The small seeded varieties, viz. Barchet and Otootan, had better germination and stand and seemed to be hardier types than the others. The seed obtained from the foreign varieties with straw yellow colour was smaller in size than the originally imported seed. In most of the plants, the seed was shrivelled. All the varieties were subject to white ant attack. The following statement shows the incidence of white ant attack, the percentage of plants with plump seed and the acclimatizing capacity of the different varieties.

Variety	No of plants soon after germination	Mortality		Final stand		Plants with plump seeds % (P)	Acclimatizing capacity seeds of variety (F × P)/100
		No. of plants	Percent	No. of plants	% (F)		
Yellow coloured seeds							
Shangai	805	606	75	199	25	23·2	5·8
Chinese White	155	121	78	34	22	82·3	18·1
Haberlandt	191	46	24	145	76	61·5	46·74
A. K. White	396	164	41	232	59	38 0	22·42
Mammoth Yellow	212	130	62	82	38	30 5	11·59
Other seeds							
Otootan (black)	291	160	55	131	45	100 0	45 00
Barchet (brown)	289	183	37	106	63	100 0	63 00
South African Brown	172	60	35	112	65	89·3	58·04

It will be seen from the above table that the black and brown seeded types are comparatively hardier and have better acclimatizing capacity than the yellow seeded types. Among the yellow seeded varieties Haberlandt has behaved comparatively better.

Maturity The observations made by Woodhouse and Taylor (1913) at Sabour, India, show that newly imported American varieties take a considerably shorter time to mature at Sabour than in America, but the plants from acclimatized seed mature somewhat later than those from freshly imported seed. Our observations recorded at Sakrand confirm the first statement of Woodhouse and Taylor, *i. e.*, the plants raised from the newly imported seed take considerably shorter period to flower and mature than that taken in the original home. The observations do not corroborate the second statement of the above authors. The data obtained here shows that in the subsequent years, the flowering and the maturity period has not been necessarily greater than that of the first year and in certain cases the period is even shorter. Probably the variation in flowering and maturity period is due to season and varieties. In almost all the varieties, the time taken to flower and to mature in different years is never more than that taken in their original home. A statement of the observations recorded at Sakrand is given in the following table. These varieties were sown in the beginning of June in all the years.

Variety	Days taken to flower					Days taken to mature				
	In U. S. A.°	At Sakrand				In U. S. A.°	At Sakrand			
		1933-34 Freshly imported seed	1934—35 Acclimatized seed	1935—36 Acclimatized seed	1936—37 Acclimatized seed		1933—34 Freshly imported seed	1934—35 Acclimatized seed	1935—36 Acclimatized seed	1936—37 Acclimatized seed
A. K. White	50—55	40	37	49	50	110	101	110	120	112
Haberlandt	50—55	45	40	47	46	125	103	101	121	108
Mammoth Yellow	85—90	55	52	63	54	145	138	126	125	128
Otootan	90—95	65	92	78	90	170	151	155	148	142
Barchet	80—85	65	87	79	89	160	151	155	144	139
Morse White	50—55	40	51	40	...	130	100	115	108	...
American Eye brow	35—40	40	...	...	...	110	98	...	...	...
Larido	75—80	50	...	...	...	140	127	...	...	...

° Data from Piper and Morse (1923).

Natural cross pollination Piper and Morse (1923) conclude from the observations at the Arlington Experiment Station that even when the test rows of several varieties are grown side by side, the percentage of hybrids is perhaps not one individual in two hundreds. They also find that the hybrid seeds can be recognised by the presence of peculiar markings on the seed. Heterozygous plants can be distinguished by the appearance of the pods at the top of the branches; such pods are more tumid, less hairy and of thinner texture. Woodhouse and Taylor (1913) conclude from the observations made at Sabour that natural crosses do not occur on the plains of India to such an extent as in America, and that the crossing occurs more frequently in the more temperate climate of America and the Darjeeling Himalayas.

At the Agricultural Research Station, Sakrand, Indian varieties of yellow, black and chocolate seeds were grown in consecutive rows in the first year. In the year 1932, a few plants (3 plants in a bed with a population of about 500 plants) were found in Pusa yellow variety which had oddly coloured seeds such as smoky yellow and yellow with brown bands. The number of such plants compared with total number of plants was very small. The seeds were grown separately next year and were found to segregate into pure yellow and other shades of yellow which were similar to a natural hybrid.

The foreign varieties tried at Sakrand, were impure in flower character and consisted of both white and purple flowers. Thirty-six single plants with white and purple flowers were selected from three varieties, viz. (1) Haberlandt, (2) A. K. White and (3) Mammoth Yellow and sown during the year 1934—35. Out of these 36 single plant cultures, 30 (13 white flowered and 17 purple flowered) bred true, while six (all purple flowered), showed segregation. During the next season, *i.* e. 1935—36, further selection of single plants was made from the cultures which had bred true to type. In all, 29 single plants were selected which were outwardly pure for flower character. The behaviour of these single plants is shown in the following table.

Variety	No. of single plants selected and sown in 1935-36			Behaviour of the selected plants				
				No. of cultures which bred true		No. of cultures which showed segregation		Total
	White flower	purple flower	Total	For white flower	For purple flower	White flower	Purple flower	
Haberlandt	7	2	9	5	—	2	2	9
A. K. White	8	2	10	8	—	—	2	10
Mammoth Yellow	—	10	10	—	10	—	—	10
	15	14	29	13	10	2	4	29

It was seen that out of 29 cultures which were pure for flower character, 23 bred true and 6 showed variation. These results clearly show that the exotic types are more subject to natural cross pollination than the Indian varieties.

Genetic behaviour of the flower colour Piper and Morse (1923) found that the mode of inheritance of flower colour is in accordance with the simple Mendelian type and that the purple colour of the flower is dominant over white colour. Woodworth (1923) reported that the purple colour was dominant to white and segregated in the F_2 in a 3:1 ratio. At Sakrand, segregations in the progenies of natural crosses found in the pure strains which were isolated from foreign varieties were recorded. The number of plants under observation was less as there was considerable mortality due to white ant attack. The goodness of fit has been worked out.

Variety & strain no.	Character of flower	F_1 phenotype obtained by natural crossing	Segregations in F_2		Goodness of fit
			Purple	White	
A. K. White—86	Purple	Purple	40	11	$\frac{1.75}{2.08}=0.84$
Haberlandt—15	Purple	Purple	21	4	$\frac{2.25}{1.46}=1.54$
		Total	61	15	
		Expected on 3 : 1	57	19	$\frac{4}{2.53}=1.57$

In the F_3 the following segregations were observed.

No. of cultures	Nature of parent	Behaviour of progeny	Frequency	
			Observed	Expected
4	Purple flower	Pure	1	1·5
		Segregating	3	3·0
2	White flower	Pure	2	1·5

In F_3 the phenotypes segregated as under :—

Phenotype like F_2	Purple	White
1	5	3
2	44	11
3	11	7
Total observed	60	21
Expected on 3 : 1	60·75	20·25

$\frac{\text{Dev.}}{\text{P. E.}}=\frac{0.75}{2.63}=.29$ The fit is good.

The behaviour of F_3 confirms the mode of single factor inheritance of flower character.

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Sorghum Grain for Food

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Sorghum (*Cholam, Jola* or *Jonna*) is the second important grain crop in the Madras Presidency. It is grown annually on an area of about five million acres in this Province and on about 36 million acres in India. The sorghum grain is the main article of food of the rural population in the dry areas. It is used extensively as human food in Africa, Asia Minor and China also. It is the chief diet of the natives in Africa. It is reported that sorghum grain is the most important source of flour in Egypt and is used in bread-making mixed with wheat, barley and fenugreek or beans.

Now that there is scarcity of rice in many parts of the Province and the people have to manage with available substitutes an attempt is made in this brief note to indicate the common methods of utilizing sorghum. There may be slight variations or modifications in the different processes involved in preparing the same or similar product in different localities. The object of this note is only to present an idea of how sorghum can be prepared for food.

The Sorghum grain is a naked grain. That is, the grain obtained on threshing the earheads and which is sold in the market has no protective covering of husk as in rice. Threshing separates the grain from the husk. The colour of the grain may be white, yellow, red or rarely brown. The colour is confined only to a thin outer layer of the grain which is the seed coat. In all the grains the inner portion, called the endosperm, is white.

In food value the sorghum grain is superior to rice though only second to wheat. It is richer than rice in protein content and richer than wheat and infinitely richer than rice in fat content. The protein content of sorghum grain varies from 8 to 12 per cent and the fat (oil) content from 1·5 to 5 per cent in the different South Indian varieties. The analyses of samples of

sorghum, rice and wheat, according to Dr. Aykroyd (*Government of India. Health Bulletin No. 23, 1937*), are given in the following table.

	Moisture	Protein	Fat	Mineral matter	Fibre	Carbohydrate
Sorghum	11·88	10·42	1·93	1·76	...	73·99
Rice (raw, milled)	12·96	6·85	0·55	0·50	...	79·14
Wheat (whole)	12·77	11·77	1·45	1·49	1·20	71·30

For most of the preparations, except when the dry grain is converted into flour, the outer seed coat or bran is removed by pounding it lightly in a wooden mortar moistening the grain slightly by sprinkling water. The pounded grain is winnowed and washed with water. The amount of material lost in this process varies from 10 to 25 per cent depending upon the variety.

Annam or Cooked grain The grain after removal of the bran is washed and cooked as it is or after breaking it into small bits in a stone mill. About twice the quantity of water is used for cooking. This is similar to cooked rice and consumed with curry and butter milk. To make *pongal* a small proportion of greengram *dhal* is mixed with the grain and then cooked.

Sankatti, Mudda or Kali The grain after removal of the bran is dried and ground into coarse powder in a stone mill. The finer portions of the powder are sieved out. The coarse powder thus obtained is cooked with about three times its quantity of water. When the whole matter is cooked to the consistency of paste, the finer portion of the powder is also added, and mixed well and cooked. A thick pasty product thus obtained is rolled into balls and eaten. This is considered to be more easily digested than the *annam*.

Kanji or Kulu The process of making this is the same as that for *sankatti*, except that a higher proportion (5:1) of water is added, so that the cooked matter is in a more liquid state.

Rotti This is the most common preparation of sorghum in the Bellary district and the adjoining Deccan tract which is the main sorghum area in India. The whole grain is ground into fine flour and sieved to remove coarse particles or bits of seed coat. The fine flour is made into dough by adding water preferably hot water. The dough is kneaded well and is divided into small balls of the size of a tennis ball. The balls are spread out by hand to form circular discs of about quarter of an inch or less thickness and eight to ten inches in diameter. This is baked on a hot pan. A small quantity of wheat or blackgram flour and a few pinches of salt may be added to improve the quality of the sorghum flour and the taste of the product. *Rotti* is sometimes preserved for use for about a week.

Dosai or Pan cake The fine flour obtained by grinding the whole grain is used for this, or the whole grain or the grain after removing the bran is soaked in water and ground into a paste. Sorghum alone or

sorghum and rice is ground first and a small quantity of similarly prepared paste of black gram is added. Salt, chillies and onions are added according to taste ; butter milk may also be added. The paste is made into *dosai* by baking on a hot pan on which oil is smeared. Sorghum mixed with red gram and black gram *dhal* may be soaked in water, ground into thick coarse paste and made into another kind of pan cake known as *adai* also.

Pops Another common or easy preparation of sorghum is the pop (*pori* or *pelalu*). All sorghums do not pop well. The grain of the variety known as *Konda jonna* in the Northern districts and *Alangara cholam, Vensamarai cholam* or *Talaivirichan cholam* in the Central and Southern districts is the best for popping. The grain of this variety pops better than that of others. When small quantities (a handful at a time) of dry grain is put on a hot pan or pot and stirred, the grains 'pop'. The pops are taken off the pan or pot immediately. The pops can be made into balls mixed with jaggery and preserved for use. The pops as such or pounded can also be used mixed with milk and sugar, or butter milk, salt and chillies.

Other preparations which are not widely known but common in some places are *kudumulu* or *hidlee*—for which the sorghum flour is mixed with cowpea or Bengalgram and condiments, converted to paste, made into balls or thick flat cakes and cooked in steam ; *chakkadam*—for which the flour is moistened with boiling water, salt added, made into small balls, cooked in steam, the cooked balls pressed in a hand press with perforated socket and the pressed stuff fried in oil ; and *burelu*—for which the sorghum flour is mixed with jaggery, moistened with water, made into small balls and fried in oil. These show that sorghum can be substituted for rice to prepare many products for every day cunsumption.

A Trial with Cocanada Cottons

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Since there had been a good market for the short staple cotton of white and red mixture and there had been increasing demand for pure red cotton I had to replace the local variety by a suitable one. For this purpose I conducted a trial in 1941-42 with the following varieties : (i) local (Kandukur), (ii) Kanigiri (Nellore district) (iii) Ambapuram (Guntur district) and (iv) X-20—a 'Cocanada' strain of the Madras Agricultural Department. All these varieties are classed as 'Cocanadas' by the trade.

The trial was conducted in black soil of medium fertility. A rectangular block of the field was divided into seven plots and the different varieties were sown in these in the following arrangement : Plot 1—local, plot 2—X-20, plot 3—local, plot 4—Kanigiri, plot 5—local, plot 6—Ambapuram and plot 7—local. Each plot contained 8 rows of plants 165 ft. long and

5 ft. apart, of which the produce of 6 middle lines of each plot was harvested separately for comparing yields. One line of redgram was sown to demarcate the boundaries between plots.

Cotton is not grown in this tract as a pure crop. It is grown mixed with a millet, like *ragi (Eleusine coracana)* or *arika (Paspalum scrobiculatum)* and pulses. About one-sixteenth by measure of pluse seeds are mixed with the millet seed. Following the local practice cotton was sown as a mixed crop with *ragi*. The crop was sown on the 4th September 1941. Ten days after sowing, gaps were filled by sowing fresh seed and crowded plants were thinned out to a spacing of 4 in. between plants.

The harvest of cotton was commenced on the 11th March 1942. Each plot was marked out by four pegs at the corners and a rope tied all round excluding the two outer rows and 5 ft. of every row at either end. The weight of kapas from each plot was weighed soon after harvest. The record of yields of the different plots are presented in the following table :—

Date of harvest	Weight of Kapas in lb.						
	Plot 1 Local	Plot 2 X-20	Plot 3 Local	Plot 4 Kanigiri	Plot 5 Local	Plot 6 Ambapuram	Plot 7 Local
11—3—1942	19	31	16	13	10	14	20
22—3—1942	5	6	16	8	5	4	5
3—4—1942	2	1	4	4	6	4	4
23—4—1942	1·5	2	2·5	1·5	2·5	1·5	1
Total	27·5	40	38·5	26·5	22·5	23·5	30

The area of each plot is $\frac{1}{10}$ acre. When the yields of the three new varieties were compared with those of the 'local' on either side, it was observed that X-20 yielded 21 percent more and Kanigiri and Ambapuram yielded 13 and 11 percent respectively less than the local. Hence X-20 was the best. Another factor in favour of X-20 was the proportion of lint to kapas. The ginning percentage of X-20 was 30 whereas the other varieties gave only 25 percent of lint.

When the money value was considered it was noted that the offer for the 'local' was Rs. 20 per candy of 500 lb. of kapas and for the X-20 kapas Rs. 25 per candy. On lint basis, the offers were Rs. 80 and 100 per candy for 'local' and X-20 respectively. The cost of seed was not taken into account as the seed is given towards ginning wages which is the local practice.

The merchants fix the price of kapas based on the assumption that the ratio of lint to kapas is 1:4. Since the proportion of lint in X-20 is greater than in the local cotton, selling as lint is more profitable. So I got the kapas ginned and sold the lint; and the seed which was given as wages for ginning was purchased for cash for feeding cattle.

While the local cotton spins to 12 to 15 counts, X-20 spins to 20 counts, as certified by the Manager, All India Spinners Association, Andhra branch, Kandukur. After a test he opined that X-20 was very satisfactory and was in no way inferior to Kanigiri red cotton which he had been mainly purchasing for his business, and that its cultivation may be extended and would find a ready market with him.

It is obvious from the particulars furnished above that X-20 cotton, a strain evolved by the Madras Agricultural Department is a better yielder, fetching an enhanced price of Rs. 10 −13−0 per acre more than the local variety in Kandukur taluk (Nellore district). The harvest of X-20 can be completed earlier than the local by about a fortnight, as it is early flowering and maturing. Saving of watchman's wages for a fortnight is an additional profit. Since X-20 is a red cotton, unlike the local variety which is a mixture of white and red, it has a better market.

Under these circumstances I may say that the public funds utilised for cotton research has been spent fruitfully to the advantage of the cultivator and it is left to my co-cultivators to make the best use of the fruits of research.

SELECTED ARTICLE

Cultivation as an aid to Soil Fertility

By E. BATCHELOR, *Sherborne, Dorset*

Geological and astronomical authorities place the age of our world at somewhere between two and three thousand million years, and that of the consolidation of its crust at about two thousand million years. Since then the agents of disintegration and denudation—water, atmosphere, heat, cold, and frost and for some hundreds of millions of years, the roots of vegetation, together with rabbits, moles and earthworms—have, mainly through the solvent action of rain water, transformed the solid rock into sand and clay and transported these products, together with minerals in solution, into the rivers, seas and oceans. The geological formations resulting therefrom after being raised above sea level, have repeatedly been subjected to the same processes of disintegration and denudation.

Observation in a railway cutting or quarry will frequently show slightly disintegrated rock at a depth of only a few feet below the surface. Above this the rock can be seen to be in progressive stages of disintegration until, at the surface, the solid formation has been transformed into fine sand or clay and is ready for erosion by rain and surface flow into adjoining streams. What is now soil on the land surface was but a short time ago, as measured by the geological clock, solid rock some feet below the surface. The rates of disintegration and denudation are clearly interdependent and vary with climatic conditions.

The use of tillage implements accelerates the rate of disintegration and denudation.

Soil fertility enhanced by tillage The mineral constituents of a plant are taken up in solution in water, but their solubility varies greatly; for example, that of silica is very much less than that of calcium. In this country disintegration is effected mainly by solution in the surface flow of water and by solution in the rain water sinking into the soil to the ground-water. The solvent power

of rain water, over that of pure water, is due to the presence of carbonic, nitric and sulphuric acids, absorbed from the atmosphere. As rain water dissolves the mineral constituents of a solid mass of unweathered rock, or of the soil derived therefrom, a part of the mineral solutes is removed by surface and ground-water flow and is lost as plant food in the vicinity of that rock or soil. Part is re-precipitated elsewhere in the rock or soil. During intervals between rainfalls, water, impelled by the pressure of surface tension (capillarity), rises to the surface of the soil and evaporates leaving deposits of minerals in the surface soil. As each particle of mineral is dissolved, the surface area of the parent rock or soil exposed to the action of water becomes larger, and the mineral content of the water in a cubic foot of rock or soil thereby increases. The rate of solution of a mineral when re-precipitated from water moving in the soil, or when deposited by the evaporation of the water containing it, is greater, often far greater, than when the mineral is first exposed to the solvent action of water on the surface of the unweathered rock. *It follows, therefore, that the rate of mineral solution, and hence the fertility of a soil, is enhanced by exposure to the action of atmosphere and rain.* This is true even if the surface is untilled; by tillage the rate is increased. When, for example, land is bare or summer-fallowed, and there are no plants to assimilate the minerals precipitated in the soil by the process of disintegration described above, considerable quantities of these minerals are accumulated, and the land is described as 'regaining fertility'. The ensuing crop will then be larger than if the soil had been continuously cropped; but the fact that continuous cropping results in a smaller yield is no justification for regarding the soil as 'exhausted'.

Manuring: *Green manuring* When green manuring, particularly with legumes, is practised, some part of the elements essential to the following crop, especially nitrogen, are fixed in the plant and are not eroded as they might be were the land bare fallowed. The ploughing up of old pasture land may be regarded as a kind of green manuring. It is frequently asserted that the keeping of land under grass is a method of building up a reserve of fertility, and that the humus so obtained is indispensable for the maintenance of fertility. However, no satisfactory definition of what is meant by 'humus' has yet been framed; nor has the writer seen any estimation, in numbers, of this 'reserve', nor of the stores of so-called 'humus'. The presence of plant roots and the ploughing in of stalks improves the texture of some soils until the roots and stalks are disintegrated and the soil settles down; *drainage and aeration may be improved through their presence.* These effects will increase fertility without the supply of minerals.

Animal manuring The value of urine and dung for improving vegetation was obvious to primitive man. Elements present in organic form in animal excreta have to be retransformed into an inorganic form before they can be dissolved in water and assimilated by the plant. There is no proof, so far as the writer is aware, that animal excreta accelerate the disintegration of the soil by natural agents. In a self-supporting area where no cattle foods or fertilizers are brought in from outside, and where the most careful conservation and application of the dung to the soil is practised, if there were no disintegration of the soil the losses of minerals in the produce removed from the area, and by erosion in the surface flow and ground water must in a very few years leave the soil barren in so far as profitable cultivation is concerned.

Such were the conditions in this country until the introduction of artificial fertilizers about a century ago (potash much later). Yet the fertility of the soil had continued to improve from the earliest times. *It follows, therefore, that the creation and maintenance of the fertility of the soil must be sought basically, in the disintegration of soil and subjacent rock.*

Continous Corn growing From the above arguments it follows that a uniform crop can be grown continuously on the same soil without animal manure, green manure or mineral fertilizers, provided the soil contains the minerals indispensable to the crop, and the crop is suited to climatic conditions. It may be objected that this is mere theory and is contradicted by practical experience. It is probable, however, that experience generally outside these islands is in accordance with the theory, e. g. in Russia, the United States of America, Canada, Australia and India. In the Central Provinces of India, wheat is grown continuously without fallow and without manure, and the yield per acre has increased since it was first observed and recorded in the 'sixties of the nineteenth century. The facts are in accordance with theory in Great Britain also, as was proved by Tull two centuries ago, and by the experiments at Rothamsted in growing wheat without manure or fertilizer continuously for the past 100 years.

It may be objected that rotation gives a larger or more valuable yield per acre in this country than abroad. The average yield of wheat per acre for the last 10 years is stated to be 32 bushels (2000 lb.) in Britain and only 13 bushels (820 lb.) in the United States of America. If it is assumed that the rotation in Britain is one of 4 years, the average annual yield per acre is only 8 bushels of wheat; if that of the corn in one other course of the rotation is included, the average annual yield of corn is only some 1000 lb. Most of the land sown with wheat in the United States of America is not under rotation, hence the reality, where *bread* is the sole criterion, is very different from the impression given by these figures. So far as the writer is aware, experiments have not been made in this country since Tull's time to ascertain the maximum uniform wheat crop obtainable without manure or mineral fertilizers; the experiments at Rothamsted have not been conducted precisely to that end. (*J. Minist. Agric. December 1942*).

Abstracts

Soil cultivation and Increased production by J. H. Hofmeyr, *Fmg. S. Afr. Vol. 17, No. 200, Nov. 1942.* Where moisture is in any way a factor limiting production and that includes the extensive maize growing areas of the Orange Free State, as well as other parts of the country, it is absolutely essential that rigid weed control should be practised in order to increase production or even, in some cases, to produce a crop at all. *Weeds and drought have an identical effect on the growth of maize and other agricultural crops.* Hence, the drier and more unfavourable climatic conditions are, the more imperative it is that effective weed control should be practised—and the sooner the better.

The production of maize may be considerably increased, without extending the cultivated area, merely by practising more effective weed control. Even for the more economical production of maize, better weed control by hand and inter-row cultivations are essential.

Although the use of a ridging plough for the inter-row cultivations of maize often yields excellent results, this implement should be judiciously used. The use of an ordinary cultivator appears to give more constant and generally satisfactory results provided the weeds are subsequently hoed by hand in the rows. The ridging plough also requires more tractive power and greater effort in handling than the ordinary cultivator. An additional disadvantage is that it leaves the land uneven, making subsequent ploughing more difficult.

The maintenance of a mulch appears to be unnecessary but generally speaking, under dry land production the number of cultivations, as well as the time of cultivation should be determined primarily by the appearance of weeds.

The additional cultivation just to maintain the mulch apparently have no or little effect on yield, and only increase production costs.

Under the prevailing conditions, when the scarcity of fertilizer and labour may definitely have a limiting effect on production, especially if the area under cultivation is injudiciously extended, it is essential that due account should be taken of the factors mentioned. This can be done only by thorough cultivation of the soil planted and the complete eradication of weeds in order to increase the *yield per morgen* as effectively as possible. The ploughing, fertilizing and planting of extensive lands frequently means a wastage of valuable fertilizer if the yield is low as a result of poor weed control due to a shortage of labour. In that case the weeds enjoy the benefit of the fertilizer.

In many cases it would pay farmers to bear in mind that the application of fertilizers cannot make up for neglect of proper weed control and the other operations associated with thorough cultivation. Not only the agricultural crop but the weeds also are nourished by the fertilizer and frequently the competition set up is to the detriment of the former, especially where moisture conditions are not so favourable. *(Author's abstract)*

Effects of weeds on growth of sugarcane. According to the *Report of the 61st Annual Meeting of the Hawaiian Sugar Planters' Association (1941)*, it had been previously shown that heavy losses of dry matter in plant cane were produced by allowing weeds to develop during the first six weeks. It has now been shown that, provided weeds are controlled during that period, later weed growth has a less marked effect. When controlled during 12 weeks in all, weed growth had but little effect upon yields; otherwise the loss was more or less proportionate to the cane's growth stage when the weed crop started.

At two centres no depression in cane yields at 15 and 22 months was produced when the final weed-control operation—ordinarily considered essential—was omitted, though in one case there had been a very heavy weed crop at three months. In both cases the initial early crop of weeds had been brought under control. At another centre the values of thorough weeding were claimed to be demonstrated: the yields were reduced if a heavy weed growth was allowed to persist while the cane was between 1½ and 4 months old. At another centre where partial weed control in third ratoon cane had seemed inadequate the final result was that less cane was harvested, but of better quality, and hence the same amount of sugar was obtained as from plots on which weed control costing three times as much had been practised. In view of these results further work on the weed problem appears necessary. *(Trop. Agriculture, Trin. February 1943)*

Rotation Experiments with Cotton in the Sudan Gezira. by F. Crowther and W. G. Cochran, *J. Agric. Sci. Vol. 32, part 4, October 1942.* Frequent fallows are the first necessity in any rotation for cotton in the Sudan Gezira. Cotton should not be sown more often than once in three years, and even that may be too frequent for maximum yields. Between cotton crops at least a year's fallow is essential and the longer the fallow the greater the benefit. Thus experimental results support fully the soundness of present rotation throughout the Gezira scheme. Up till 1932—33 the rotation was three yearly with at least one full year's fallow per cycle. Then the rotation was changed to four yearly with two or three years' fallow per cycle.

Inclusion of dura[1] in the rotation invariably reduces cotton yields. Least harm is done when dura immediately follows cotton, with at least one fallow year before cotton recurs. Lubia[2] was in no case markedly superior to fallow but may prove slightly more beneficial than fallow when included in a short

1. Sorghum, 2. *Dolichos lablab.*

rotation following cotton or dura. On the other hand, if grown after fallow, lubia decreases the cotton yields.

In view of the large increases regularly obtained from nitrogenous fertilizers the benefit of lubia is surprisingly small and that of fallow surprisingly great.

By contrast, fallowing on irrigated land in Egypt is rarely justified for a spell longer than two or three months, the period necessary for cultivation. The high value of the land there together with the expenses of canal digging and maintenance render fallowing uneconomical. Fortunately in the Gezira land is plentiful and cheap. If in the future its value rises and cropping has to be more intensive, lubia will replace much of the fallow; meanwhile fallowing is a simple way of controlling weed growth and allowing recovery of the land without expenses of cultivation and supervision. (*Author's abstract*)

Relation of soil organic matter to the production of flue-cured tobacco by H. A. Horton *Sci. Agric. Vol. 22. No. 9, May 1942.* Results obtained from field plot experiments with flue-cured tobacco have shown that there is a general tendency toward higher yields of marketable leaf from plots containing larger amounts of soil organic matter. Where tobacco was grown every year the highest yields and the highest total organic matter were obtained where manure was applied and rye cover crops were grown in the intervals between seasons. The 2-year rotations in which tobacco was alternated with rye gave greater returns per acre than where tobacco was grown every year. The 3-year rotation in which tobacco followed two crops of rye provided much larger yields and returns per acre, and the soil organic matter was considerably higher than where tobacco was grown every year. In the 2-year rotations the application of manure caused significant increase in the content of soil organic matter but it did result in considerably increased yields of tobacco. At the same time the level of the organic matter was maintained under the increased production.

While the soil organic matter may not have been significantly increased by applying manure or by returning the rye crops produced in a 2-year rotation, the production of leaf was enhanced by these practices. In this way the value of the crop was definitely related to the amount of organic material which was added to the soil. (*Author's abstract*)

Gleanings

Economic value of plants The common Stinging Nettle (*Urtica dioica*) found in Great Britain was very much used during the last war both by Great Britain and Germany and is also being used in the present war. The bast fibres are very strong and are composed of a very pure form of cellulose. They are used in the manufacture of textiles and also in paper making. Use can be made of the chlorophyll, while the leaves are rich in feeding value and can be fed to cattle.

Here in Rhodesia our two main fibre crops from an economic point of view are sisal, which is grown chiefly in the Sabi Valley, and sunnhemp, which can be grown practically all over Rhodesia. Up to the present the drawback about sunnhemp has been the difficulty in extracting the fibre, but this has now been overcome by the invention of a new machine made in Rhodesia, and it is hoped that in the near future sunnhemp will form a profitable industry in the colony.

Another plant of great economic importance at present is stramonium (*Datura stramonium* and *D. tatula*). A full description of these plants was given in an article in the last issue of this Journal and in the present issue a note will be found on the marketing of stramonium. This plant contains the alkaloid—Atropine, which is used as a nerve stimulant and also for the relief of asthma.

Supplies are very short in Britain, and South Africa is sending large quantities overseas. Rhodesia is also playing her part in the collection of this important plant, and with the help promised by the various Women's Institutes it is hoped that appreciable quantities will be collected in the Colony for shipment overseas.

The yellow flowered poisonous shrub *Thevetia neriifolia* is familiar to most of us, and is often found as an ornamental shrub in gardens. It has been found that the kernels of this shrub contain a powerful insecticide. The kernels are ground and soaked in water for about 24 hours, filtered and a little soft soap added to the filterate. The resulting solution was found to be very effective against various insects such as aphids. A concentration of ¼ to ½ oz. of kernel per gallon of water was found to be satisfactory.

Finally, as we are aware, citrus fruits are scarce at home and a substitute for these has been found in parsley. It has been proved that parsley is very rich in Vitamin C—the Vitamin which prevents scurvy, and that parsley can take the place of citrus fruits. A socalled 'lemonade' can be made from parsley. (*Rhod. Agric. J. November—December 1942.*)

Vegetable oils as lubricants Owing to the growing difficulty of obtaining mineral oils from the U. S. of America the Transport Advisory Council has recently given information regarding the development of suitable lubricants composed of vegetable oils to replace mineral oils. The present annual consumption of vegetable oils used as lubricants is stated to be as much as 8,000 tons of castor oil, 1,500 tons of blown rape oil by the Railways, and 6,000 tons in sugar and ginning factories, and oil, rice and other mills. It is estimated that if vegetable oils were used for all applications for which they are suitable in place of mineral oils, the annual consumption would be approximately 46,000 tons.

A number of tests have been carried out during the past two years using lubricants which consist of 100 per cent vegetable oil as well as a number of blends of vegetable oil and mineral oil. Well-refined castor oil has been proved to be as good a lubricant as any for locomotives, the bearings of steam engines and for all heavy gears. Blends of mineral oil and blown rape oil are being used as axle lubricants for railway carriages and wagons as well as for compounded marine engine oils. Blends of mineral and groundnut oil are useful for the lubrication of compressors, gas engines and looms. Coconut oil is also used for looms. During the year 1941 arrangements were made by which 800 tons of castor and blown rape oils were substituted for mineral axle oils in the Indian Railways alone. Actually this absorbed practically all the available production of suitable castor oil. Trial runs of over 2,500 miles of motor cars with blends of castor oil with either groundnut or rape oil for lubricants have shown satisfactory results.

It is reported that the petroleum companies are now considering the possibility of marketing mixed blends of vegetable and mineral oils for the production of which their requirements are likely to be from 12,000 to 15,000 tons of castor and rape oils per annum. (*Planters' Chroni. April 24, 1943*).

Two hundred cabbages a minute The increase in cabbage planting has made farmers more familiar with a machine which has been on the market for some time, known as the Robot transplanter. Four operators are seated around a tray of cabbage plants, which are picked up by the operators and placed into rubber clips conveyed by means of a belt around the top of the machine, and carried down and deposited vertically in a furrow made by a forward shoe. The furrow is closed by means of two wheels set at angles which press the sides of the furrow. This machine, which sets out 200 plants a minute can, by altering the clips be adapted for sowing potato seed, and has recently been fitted with a

water tank, so that plants can be planted in all sorts of weather during the proper season, *(Rhod. Agric. J. November—December 1942).*

Argentine storing corn under-ground The Argentine Ministry of Agriculture has announced the successful completion of an experiment to store corn in underground silos. A year ago 16 such silos were constructed in Cordoba, and the shelled corn stored in them was found to be in excellent condition when inspected recently. This type of storage is regarded as desirable because it would release wire and other essential materials ordinarily used in the building of maize stacks. *(Agric. Amer. September 1942)*

Motor fuel from sugarcane Experiments conducted at Louisiana State University by Dr. J. W. Jean have led to production from black strap molasses of a motor fuel called Jeanite. While not competitive in price with gasoline, the product is believed to have potential value for the several American republics which have no petroleum but do have extensive sugarcane.

Most other experiments in the use of grains and similar products for motor fuels have involved the production of alcohol for blending with gasoline. The new process avoids the objections of this procedure by producing entirely from molasses a fuel which is practically identical with gasoline in fuel value and octane rating. *(Agric. Amer. March 1942)*

Hints for Bee-keepers

For July, 1943

Unfavourable pasturage and weather conditions continue during this month also. A number of crops and trees such as maize, gingelly, *cumbu, babool, Peltophorum, Poinciana regia,* tamarind and drumstick are in flower, but the characteristic drizzly weather and the strong winds make it difficult for the bees to go out for foraging. Brood rearing is very poor and there is a steady reduction in the hive population. The information given during the previous month regarding the care of bee colonies applies to this month also. Special care has to be taken to ward off the bee enemies which are particularly active during these lean months.

Apart from the wax-moth, the bees have to contend with a few other enemies. The more important of these are (1) the black ant, (2) the yellow banded wasp and (3) the bee-hunter wasp. The occurrence and the habits of the black ant are too well-known all over South India to deserve any special mention here. Numbers of these ants sometime invade bee-hives and devour the food materials, brood and very often the bees also. The pest can be easily controlled by providing the hives with ant pans. Their underground colonies can be destroyed by dropping a few granules of calcium cyanide (a deadly poison) into the holes and closing them immediately. Dilute tar or kerosene also may be used. The yellow banded wasp can be often seen hovering about the entrance of bee-hives and carrying away stray bees. They can be handnetted and killed. These wasps, like bees, live in colonies in hollow spaces inside trees, walls, etc. Their colonies can be "gassed" with calcium cyanide after nightfall and the exit openings closed with clay. They can also be smoked or burned during nights.

A small bee-hunter wasp is occasionally found to cause appreciable damage to bee-colonies in certain localities. They are dark in colour with yellowish transverse bands, thick set and very active in their habits. They nest in underground tunnels in shady corners and sandy banks of fields. Relief can be obtained by digging out their nests or by hand-netting the adults. Besides these there are a few minor enemies which often infest bee colonies. The Death's head moth sometimes enters the hives and drinks away the honey stored in the cells.

but they are invariably killed by bees before they get out. Another minor bee enemy is the lesser wax moth. The caterpillars generally feed on the debris accumulated on the floor board, but they sometimes infest the stored combs. The hive and its parts should be kept clean and the caterpillars may be eliminated from the infested combs as in the case of the wax moth larvae. A few other insects like dragon flies, the wax beetle and leaf cutter wasps, and animals like lizards, frogs and toads and birds like the Drongo and the bee catcher, cause some minor damage but the loss is not serious enough to warrant any control measure.

M. C. Cherian and S. Ramachandran

Crop & Trade Reports

Cotton raw, in the Madras Presidency The receipts of loose cotton at presses and spinning mills in the Madras Presidency from 1st February 1943 to 4th June 1943 amounted to 184,616 bales of 400 lb. lint as against an estimate of 430,400 bales of the total crop of 1942-43. The receipts in the corresponding period of the previous year were 229,070 bales. 245,308 bales mainly of pressed cotton were received at spinning mills and 639 bales were exported by sea while 99,024 bales were imported by sea mainly from Karachi and Bombay. *Director of Agriculture, Madras.*

Moffussil News and Notes

Agricultural Exhibitions—Salem district An agricultural exhibition was put up during the last week of April 1943 at Krishnagiri in connection with the Krishnagiri Taluk Tournaments. The exhibition was opened by the Sub Collector, Hosur. Posters on Grow More Food, better preservation of manure and other agricultural improvements were put up with suitable exhibits. Improved implements were arranged in the stall in the form "V". Specimens of E. C. 593 and local *ragi* plants and ear-heads of E. C. 593, A. S. 1543 *cholam* and Adt. 16 paddy were included in the exhibits and they were much appreciated by visitors. Specimens of locally raised vegetables, chini orange, pomelo, and mango fruits were also exhibited. Preparation of *ragi* malt and extraction of honey from bee-hives were the other items. A certificate of merit by the District Collector of Salem was awarded to the Agricultural Section.

An agricultural exhibition was put up in the premises of the Board High School, Tiruchengode, during the first week of May 1943 in connection with the tournaments conducted by the Rural Uplift Association. The exhibition was opened by the District Collector, Salem. Specimens of improved strains of paddy, millets, cotton and the local vegetables and fruits were put up in the stall. Explanatory notes and posters were put up by the side of each exhibit and these were instructive to visitors. Live plants of *bodantum*, *Cassia siamia* and *Glyricidia maculata* were exhibited with suitable posters explaining the prospects of their cultivation in the taluk. Posters on Grow More Food Crops and Vegetables was a special feature. A bee-hive with all bee-keeping appliances was put up and the economic aspect of bee-keeping as a cottage industry was explained to the visitors. The District Collector, Salem distributed 12 prizes (9 ploughs, by the Co-operative Societies, one P. S. G. 6. plough, one *mamooty* and 45 lb. of groundnut cake by the Department) and 13 certificates of merits to *ryots* of the Tiruchengode Taluk who cultivated maximum area under food crops.

D. A. O. Salem.

Estate News and Notes

The College The College reopened after the summer recess on the 15th June for the II and III year classes. Selection of students for admission to the I year class has been made by the Principal.

Imperial Sugarcane Station Rao Bahadur B. Viswanath, C. I. E., Director, Imperial Agricultural Research Institute, New Delhi, held a Durbar on the 14th June at the Imperial Sugarcane Station, to present the isignia and Sanad of Rao Sahib to Mr. R. Thomas, Assistant Sugarcane Expert. After the Durbar, Rao Bahadur Viswanath unveild a portrait of Rao Bahadur Sir T. S. Venkatraman, Kt. C. I. E., D. Sc. The function was held at the Laboratory of the Station. The guests who were invited for the function were entertained to Tea. The portrait was an oil painting by Mr. V. G. Emmanuel, and was much appreciated.

Visitors Rao Bahadur B. Viswanath and Sri K. Coomaraswami Chetty. Assistant, Marketing Officer, New Delhi, camped at the Estate during the month.

RETIREMENT

Mr. R. W. LITTLEWOOD, N. D. A., I. A. S.

Mr. R. W. Littlewood was born in June 1888 at Wakefield, Yorkshire. He was educated at Queen Elizabeth Grammar School, Wakefield, and Leeds and Reading Universities He underwent training in farming and cattle breeding in Lord Middleton's Home Farm, Bridsall, Malton. He was in service in England in the Inland Revenue Department. He resigned his post to accept a Commission in the R. F. A. during the last Great War. He saw active service in France and was invalidated at the end of 1917. In 1918 he was appointed Horse Officer for the Somerset War Agricultural Committee and later in 1919 was appointed as an Agricultural Costings Officer, under the Ministry of Food.

He was appointed as a member of the Indian Agricultural Service in October 1920 and joined the Madras Agricultural Department as Deputy Director of Agriculture-Livestock, in January 1921. He had his headquarters at Coimbatore till 1924. When the Army Remount Depot at Hosur was handed over to the Madras Agricultural Department, it was converted into a Livestock Research Station and the office of the Deputy Director also was transferred to Hosur. He was responsible for the organisation and development of this excellent cattle farm which is one of the biggest and best cattle breeding stations in India. The Ongole Cattle Breeding Station at Chintaladevi and the Buffalo Breeding Station at Guntur were also under his control, until the stations were absolished in 1932. For a short period in 1936 he was appointed as Principal of the Agricultural College, Coimbatore. When the Hosur cattle farm was transferred to the Veterinary Department in 1938, the services of Mr. Littlewocd also were transferred to that Department as Livestock Development Officer.

He was a member of the old Board of Agriculture in India and represented Madras at the first Imperial Agricultural Research Conference in London in 1927. He was a member of the Dairying and Cattle Breeding Committee of the Imperial Council of Agricultural Research. He has published various papers on cattle breeding and allied subjects, and his book on *Livestock of Southern India* is an exhaustive and practical handbook.

During the period he was Principal of the Agricultural College, Coimbatore, he was ex-officio President of the Madras Agricultural Students' Union

He went on leave on 18th March 1943 preparatory to retirement and lays down his office on superannuation on 19th June 1943.

We wish Mr. Littlewood a long and happy life in retirement.

Departmental Notifications

Gazetted Service—Appointments

Sri V. K. Subrahmanya Mudaliar, Asst. Cotton Specialist, Adoni, to act as D. A. O. Kurnool.

Sri A. Chidambaram Pillai, A. D. Conjeevaram to act as D. A. O. South Arcot.

Sri M. P. Sankaran Nambiar, A. D. Dharapuram to act as Special D. A. O. Vizagapatam for Vegetables.

Sri V. Achutharamayya, F. M. Samalkota to act as D. A. O. Ellore.

Sri G. Sakharama Rao, A. D. Karkal to act as D. A O. Ramnad.

Sri V. Satagopa Ayyangar, A. D. Mayavaram to act as D. A. O. Tinnevelly.

Sri S. Venkatarama Ayyar, F. M. Palur to act as D. A. O. Nellore.

Sri P. A. Venkateswara Ayyar. Teaching Asst. in Agriculture, Coimbatore to act as D. A. O. Guntur.

Sri C. Jaganatha Rao, Asst. in Cotton, D. F. S. Hagari, is appointed to officiate as Asst. Cotton Specialist, Adoni.

Transfers and Postings

Sri C. Ramaswami Nayudu, on return from leave, is posted to act as Dy. D. A. Coimbatore vice Sri B. Ramayya on leave.

Sri U. Vittal Rao, D. A. O. Mangalore to be D. A. O. Coconada.

Sri S. Sitharama Pathrudu, D. A. O. Coconada to be D. A. O. Vizagapatam.

Sri M. V. Raghava Rao Nayudu, D. A. O. Vizagapatam to be Special D. A. O. for Vegetables, Vizagapatam.

Leave

Sri A. Gopalakrishniah Nayudu, D. A. O. Nellore, l. a. p. for 1 month and 5 days from the date of relief.

Sri K. Avidainayakam Pillai, D. A. O. (on leave) extension of leave on half average pay for 6 months on m. c. from 2—5—43.

Sri T. G. Muthuswami Ayyar, D. A. O. Tinnevelly, l. a. p. for 2 months from 1—5—43.

Janab A. Gulam Ahmed Sahib Bahadur, D. A. O. Kurnool, l. a. p. for 2 months from the date of relief.

Sri T. S. Ramasubramania Ayyar, Asst. Agricultural Chemist, Coimbatore extension of leave on half average pay for 1 month from 13—6—43.

Subordinate Service—Appointments

The following officiating appointments of Upper Subordinates, III Grade, are ordered with effect from 1st July 1943—

P. Narayanan, A. D. Hosur; L. Venkataratnam, A. D. Coimbatore; Ch. Soundararajan, Asst. Mycology Section, Coimbatore; K.N. Doraiswami, A. D. Ramnad; B. Srinivasa Rao, F. M. Coconut Station; A. Subramanyam, Asst. Millets Section, Coimbatore; N. Srinivasulu, A. D. Tadepalligudem; K. Narayana Rao, A. D. Hadagalli; A. Sankaran, F. M. Anakapalle; M. Gopalakrishna Kamath, A. D. Kollegal; P. V. Suryaprakasa Rao, A. D. Badvel; K. Bhaskaran, F. M. Samalkotta; K. V. Srinivasan, Asst. Mycology Section, Coimbatore; U. Sanyasi Rao, A. D. Podeli (Nellore Dt.); B. Vasudeva Rao, A. D. Dhone; V. Venkatasubrahmanian, Asst. Entomology Section, Coimbatore; B. Narasimham, A. D. Pattikonda; E. Jagannatha Rao, A. D. Madakasira; K. S. Suryanarayana, Asst. Chemistry Section, Coimbatore; D. Narayana Rao, Asst. in Cotton, Nandyal; Y. Chintamani, A. D. Parvatipuram; H. Narayana Kamath, A. D. Malabar district.

Transfers and Postings

Name of officers	From	To
Sri S. Muthuswami	Asst. in Fruit, F. R. S. Koduru	A. D. L. R. S. Hosur for the cultivation of vegetables.
„ A. Shanmugasundaram	A. D. Wheat Rust Control Scheme, Coonoor	Asst. in Paddy, A. R. S. Pattambi.
„ S. Mahadeva Ayyar	A. D. Kodaikanal	A. D. Koilpatti.
„ G. Doraiswami	A. D. Koilpatti	F. M. A. R. S. Koilpatti.
„ P. Somayajalu	A. D. Salur	A. D. Ramachandrapur.

Leave

Name of officers	Period of leave
Sri M. Suryanarayana, Asst. in Chemistry, Coimbatore	Extension of l. a. p. on m. c. for 4 months from 28—5—43.
Janab Muhammad Fasiuddin Sahib, Asst. in Cotton, Adoni	Extension of leave on half average pay on m. c. for 1 month and 15 days from 21—5—43.
Sri K. Cherian Jacob, Asst. in Botany, Coimbatore	L. a. p. on m. c. for 4 months from 24—5—43.
„ M. P. Narasimha Rao, Cotton Asst. Nandyal	L. a. p. on m. c. for 2 months from 17—5—43.
„ V. M. Ramunni Kidavu, A. D. Perintalmanna	L. a. p. on m. c. for 3 months from 6—6—43.
„ M. K. Swaminathan, A. D. Orthanad	L. a. p. for 1 month from 16—6—43.
„ K. B. Viswanathan, Asst. A. R. S. Marutur	L. a. p. for 5 weeks from the date of relief.
„ T. V. Srinivasacharlu, A. D. Sriperumbudur	Extension of l. a. p. on m. c. for 1 month from 20—6—43.
„ C. Venkatachalam, A. D. Tadepalligudem	Earned leave for 90 days on m. c. from 29—4—43.
„ M. P. Gowrisankara Ayyar, A. D. Devakottai	Extension of l. a. p. for 1 month from 21—6—43.
„ M. L. Narayana Reddi, A. D. Anakapalli	L. a. p. on m. c. for 1 month from 5—6—43.

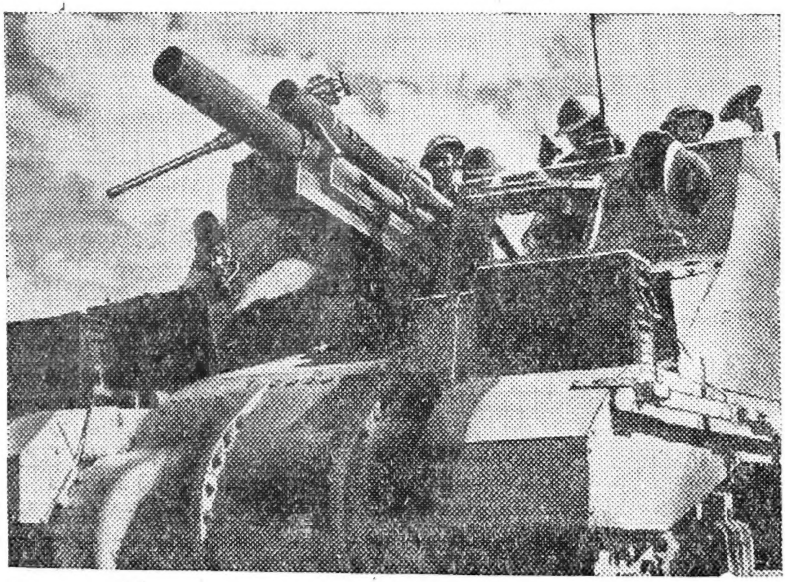
An Appeal

The Editorial Board of the Madras Agricultural Journal will be glad to receive contributions from readers on subjects of agricultural and horticultural interest with special reference to the different aspects of the Grow More Food Campaign. It is requested that manuscripts are sent typed and do not exceed six pages.

S. V. Doraiswami

Secretary,

Madras Agricultural Students' Union.



SU. 24.

The "Priest": New 8th Army Weapon which outgunned Rommel.

Picture shows: The business end of a "Priest" 105 mm. self-propelling gun.